

a refractive layer of optically transmissive material adjoining the side walls within the trench and conforming to the side walls, the refractive layer having an index of refraction; and

10 a core of optically transmissive material adjoining the refractive layer within the trench and conforming to the refractive layer, the core having an index of refraction; and wherein:

the index of refraction of the core is greater than the index of refraction of the refractive layer, and the index of refraction of the refractive layer is greater than the index of refraction of the dielectric material.

2. (Original) A waveguide as defined in claim 1 wherein:

the refractive layer surrounds the core except on one side; and
the dielectric material contacts the core on the one side where the refractive layer does not surround the core.

3. (Amended Once) A waveguide as defined in claim 2 wherein:

the refractive layer is U-shaped and surrounds the core except on the one side.

4. (Amended Once) A waveguide as defined in claim 1 wherein:

the refractive layer is U-shaped and surrounds the core except on the one side; and further comprising:

5 a cap of the refractive material extending across the one side of the core between ends of the U-shaped refractive layer, the cap adjoining and conforming to the core and the refractive layer, the cap having essentially the same index of refraction as the U-shaped refractive layer; and wherein:

the cap and the U-shaped refractive layer encircle the core.

5. (Amended Once) A graded index of refraction waveguide formed in an integrated circuit-like structure having a substrate, comprising:

5 at least one layer of dielectric material positioned above the substrate and defining a trench having side walls, the dielectric material having an index of refraction;

a first refractive layer of optically transmissive material adjoining the side walls within the trench and conforming to the side walls, the first refractive layer having an index of refraction;

10 a second refractive layer of optically transmissive material adjoining and conforming to the first refractive layer within the trench, the second refractive layer having an index of refraction;

a core of optically transmissive material adjoining and conforming to the second refractive layer within the trench, the core having an index of refraction; and wherein:

15 the index of refraction of the first refractive layer is greater than the index of refraction of the dielectric material, the index of refraction of the second refractive layer is greater than the index of refraction of the first refractive layer, and the index of refraction of the core is greater than the index of refraction of the second refractive layer.

6. (Original) A waveguide as defined in claim 5 wherein:

the first and second refractive layers surround the core except on one side; and

5 the dielectric material contacts the core on the one side of the core where the first and second refractive layers do not surround the core.

7. (Amended Once) A waveguide as defined in claim 6 wherein:

the first and second refractive layers are each U-shaped;

2 the second U-shaped refractive layer surrounds the core except on the one side of the core; and

5 the first U-shaped refractive layer surrounds the second U-shaped refractive layer except on the one side of the core.

8. (Original) A waveguide as defined in claim 7 further comprising:

a cap of the refractive material extending across the one side of the core between ends of one of the first or second U-shaped refractive layers, the cap extending between the core and the dielectric material, the cap having essentially

5 the same index of refraction as the U-shaped refractive layer to which the cap is connected; and wherein:

the cap and the one of the U-shaped refractive layers to which the cap is connected encircle the core.

9. (Original) A waveguide as defined in claim 7 further comprising:

a first cap of refractive material extending across the one side of the core between ends of the first U-shaped refractive layer, the cap adjoining and conforming to the core and the refractive layer, the cap having essentially the

5 same index of refraction as the first U-shaped refractive layer;

and

a second cap of refractive material extending across the one side of the core between ends of the second U-shaped refractive layer, the second cap having essentially the same index of refraction as the second U-shaped refractive

10 layer;

the first cap adjoins and conforms to the dielectric material and the second cap;

the second cap adjoins and conforms to the core and the first cap;

the first cap and the first U-shaped refractive layer encircles the

15 second cap and the second U-shaped refractive layer; and

the second cap and the second U-shaped refractive layer encircles the core.

10. (Original) A waveguide as defined in claim 5 wherein:

the first refractive layer is formed by deposition in a self-aligned manner with the trench;

5 the second refractive layer is formed by deposition in a self-aligned manner with the first refractive layer; and

the core material is formed by deposition in a self aligned manner with the second refractive layer.

11. (Original) A waveguide as defined in claim 1 wherein: